March 31, 1943

OFFICE OF CIVILIAN DEFENSE
WASHINGTON, D. C.

COURSE OUTLINE
STATE AND LOCAL GAS SPECIALIST SCHOOLS
OCD Publication 2211

SAFEGUARDING INFORMATION

I. Classification of information and basis of classification

- A. Restricted
- B. Confidential
- C. Secret

II. Value of information to the enemy

III. Causes of leakage of information

- A. Excessive talking because of
  1. Conceit
  2. Faith
  3. Enthusiasm
  4. Ignorance

IV. Thing not to be talked about

- A. Troops
- B. Harbors, ships and cargoes
- C. Damage
- D. Airplanes
- E. Fortifications
- F. Anti-aircraft measures
- G. Production
- H. Weather
- I. Rumors, harmful stories, etc.

V. Discussion of Doolittle's raid on Tokyo

- A. The value of the press and radio reports received

VI. The reports, records and summaries incidental to work of the Citizens Defense Corps must be safeguarded.

- A. Information pertaining to air raids and amount of damage
- B. Charts, maps, plans, mechanical arrangements
- C. Preservation of material and evidence from sabotage and raids

(OVER)

NONPERSISTENT AGENTS

I. The popular conception of chemical warfare as a new, deadly and inhuman weapon can only be eradicated by education.

A. The history of ancient and medieval wars contains frequent references to the use of chemical weapons.

1. The use of poisoned food and water, "Greek fire" and venomous snakes by Greeks and Romans.
2. The use of hot pitch in defense of walled cities.

B. The mortality figures of the last war showed only 1.7-4.2% mortality among the gas casualties in all the armies.

1. The incidence of permanent injury was very low.
2. Comparison with high explosive shows gas warfare in a less inhuman light.

C. The importance of proper education in gas defense.

1. Troops poorly trained in gas defense suffered a much greater proportion of casualties than well trained troops.
2. The important military purpose of the use of chemical agents on civilians is to foster panic.

a. Panic arises because of fear, particularly of the unknown.
b. Both fear and panic can be overcome by training and education.

3. If defense against a weapon is adequate, then the enemy can gain no advantage by its use.

II. The development of modern chemical warfare started in 1914.

A. The establishment of the Chemical Section of the German army under Haber was the first modern recognition of the possibility of chemical warfare.

1. Haber was selected because he had solved the nitrate problem.
2. The first investigations by Haber were attempts to find new poison gases.
3. The realization of the economic and supply factors in choice of agents led to the selection of chlorine.

B. The first gas attack in April 1915 was a complete surprise and success.

1. The amount of material and the methods of dissemination prevented a trial on a larger scale.
2. The success of the attack was unexpected and the Germans were not prepared to gain by it.
3. Immediate plans were rushed to repeat this attack, but the English and French had prepared for this event.

III. The gas mask was speedily improvised and issued before a second attack.

A. The first of these were cotton pads soaked with soda, later with hypo.
B. The next step was an impregnated hood.
C. The British, later the French, developed the box respirator with a tube leading to the mask, a mouthpiece, and nose clamps.
D. The French developed a mask designed to fit the face tightly.

1. The clamps and mouthpiece were discarded.
2. Arrangements were made to draw incoming air over the eyepieces to prevent fogging.

IV. New agents were developed fairly rapidly to replace chlorine.

A. Phosgene was first used in December 1915, but the Allies were prepared.

1. Phosgene is an efficient chemical agent about 10 times as toxic as chlorine.
2. Its disadvantages are its volatility (requiring special cylinders) and its rapid hydrolysis.

B. Diphosgene was developed because of its higher boiling point.

1. It is more persistent and about as lethal as phosgene.
2. It does not require cylinders for transport.
3. It is probably the only nonpersistent gas being manufactured in Germany.

C. Chloropicrin was developed because of its greater persistency and stability.

1. Its irritative effect on the eyes is often noted before its odor.
2. It is only removed from air by efficient masks.
3. Decontamination is difficult and in winter it may persist for 12 hours.

V. The sternutators were developed as mask breakers.

A. DA, diphenylchloroarsine, was first used by the Germans in July, 1917.

1. A container was placed inside an explosive shell and particles were thrown into the air by the explosion.
2. These particles were relatively large and easily removed by masks containing filters.
3. The smoke candle was developed to produce finer particles which can be removed only by efficient filters.

B. Adamsite is a gas of this type which has not been used in actual warfare.

1. It should be remembered that these agents are nonpersistent because they settle to the ground.
2. They contain arsenic and therefore are also systemic poisons.

PERSISTENT AGENTS

I. Mustard (HS)

A. History and nomenclature

1. $(Cl\ CH_2\ CH_2)_2S$, HS, blister gas, Gelb Kreuz, Lost
2. Discovered by Victor Meyer in Haber's laboratory
3. First used in July, 1917
4. Probably the most effective and most efficient chemical agent used in the last war

B. Physiological effects

1. Vesicant action
2. Eye irritant effects of vapor
3. Lung irritant effects

a. 0.006 to 0.2 mg. per litre may be fatal depending upon time of exposure.
b. This effect may be produced by concentrations difficult to detect by odor.

C. Physical and chemical properties

1. Oily liquid, usually colored, having a fairly low vapor pressure.
2. Chemically it is fairly reactive.

a. Hydrolysis reactions
b. Oxidation reactions
c. Substitution reactions

D. Tactical considerations

1. Has tremendous possibilities as a panic producer because of its delayed action.
2. Is a very effective defensive weapon.

II. Nitrogen mustards (HN_2 and HN_3)

A. History and possibilities

1. Relationship to ordinary mustard (vesicophore group)
2. The overlooked references in the literature

B. Physiological effects

1. Generally similar to those of HS
2. More volatile nitrogen mustard (HN_2) is a very dangerous eye irritant and lung injurant.
3. Both nitrogen mustards act more rapidly than HS in producing blisters.
4. Special physiological effects

C. Physical and chemical properties

1. Have faint fishy odors.
2. HN_2 is quite volatile and persists only 2 to 4 hours. It is more volatile than ED.
3. HN_3 is less volatile than mustard and produces dangerous vapor concentrations only in closed spaces.
4. Nitrogen mustards are basic substances.
5. Are fairly readily hydrolyzed.
6. Are not affected by active chlorine compounds.

D. Tactical considerations

1. Their faint odor increases their potential effectiveness.
2. Have the same value as HS otherwise.

III. Lewisite, M-1

A. General description

1. Invented by Lee Lewis during World War I, but never used in actual warfare.
2. Its arsenic content probably makes it a systemic poison.

B. Physiological effects

1. Primarily a vesicant, acting more rapidly than HS
2. More volatile than HS and therefore more dangerous as a lung injurant
3. Extensive burns which result in arsenical poisoning

C. Physical and chemical properties

1. Dark, oily liquid with considerable volatility
2. Very easily hydrolyzed
3. Readily oxidized
4. Decomposition products are dangerous because of their arsenic content

D. Tactical considerations

1. Lack of experience prevents any true assessment of its value.

METHODS OF DETECTION AND SAMPLING, GENERAL

I. Sampling

A. General precautions and protective equipment

B. Purpose

1. Collection of samples for identification

a. Local
b. Chemical Warfare Laboratory

2. To define limitations of contamination
3. To check effectiveness of decontamination procedures

C. Type of sample

1. Air containing poisonous vapor
2. Contaminated material

a. Water
b. Food
c. Soil
d. Building materials, cloth, etc.

D. Methods of sampling

1. Air

a. Collection of a definite volume of air
b. Passage of known volume of air over an adsorbing material

2. Materials - containers and equipment

a. Water
b. Food
c. Soil
d. Building materials, etc.

II. General methods of detection of agents

A. Subjective

1. Sight

a. Appearance of gas or smoke clouds
b. Appearance of liquid agents
c. Effect of agents on vegetation, cloth, etc.

2. Smell

a. Technique of "sniff testing"
b. Uncertainties of odors, masking, etc.

3. Taste

a. Tobacco test

4. Physiological effects

B. Use of simple detector equipment

1. HS vapor detector kit

a. Uses
b. Limitations

2. Vesicant detector paint

a. Uses
b. Limitations

3. Vesicant detector paper - same properties as paint

4. Vesicant detector crayon

a. Uses
b. Limitations

5. Special test papers

a. Acid base indicating paper
b. Sodium iodoplatinate test paper for HS
c. Harrison test paper for phosgene and diphosgene
d. Dimethylaniline test for chlorpicrin

6. Detector powder - Sudan Red

a. Uses
b. Limitations

7. Telltale lamp

METHODS OF DETECTION AND IDENTIFICATION OF WAR GASES,

SPECIAL

Laboratory test reactions of war gases

I. General

A. Development of acidity or hydrolysis

1. Reagent - Methyl Red
2. Apparatus
3. Procedure
4. Uses, sensitivity, limitations

B. Precipitation of silver ion by chloride

1. Reagent - silver nitrate
2. Procedure
3. Uses, sensitivity, limitations

C. Reduction of alkaline permanganate

1. Reagents - sodium hydroxide and potassium permanganate
2. Apparatus
3. Procedure
4. Uses, sensitivity, limitations

D. Modification of pyridine - sodium hydroxide reaction

1. Reagents

a. Pyridine
b. Ammonium hydroxide solution
c. Sodium hydroxide solution
d. Sodium cyanide solution

2. Apparatus
3. Procedure
4. Uses, limitations, sensitivity

II. Specific tests

A. Phosgene

1. Harrison's reagent test

a. Reagent
b. Procedure
c. Sensitivity

B. Chlorpicrin

1. Diphenylamine test

a. Reagent
b. Apparatus
c. Procedure
d. Sensitivity
e. Interference

2. Nitrite test

a. Reagent
b. Procedure
c. Sensitivity and limitations

C. Mustard

1. Sodium iodoplatinate test

a. Reagent
b. Apparatus
c. Procedure
d. Sensitivity

2. Gold chloride test

a. Reagent
b. Apparatus
c. Procedure
d. Sensitivity

3. Grignard's Potassium Iodide Test

a. Reagent
b. Procedure
c. Sensitivity and limitations

4. Beta naphthol test

a. Reagent
b. Procedure
c. Sensitivity

D. Lewisite

1. Acetylene test

a. Reagents - Preparation of Ilosvay reagent
b. Procedure
c. Sensitivity
d. Limitations and interferences

2. Gutzeit test

a. Reagents
b. Procedure
c. Sensitivity
d. Limitations and interferences

E. Methyl dichlorarsine and ethyl dichlorarsine

1. Gutzeit test - see above
2. Mercurous nitrate test

a. Reagents
b. Procedure
c. Sensitivity and limitations

3. Hydrogen sulfide

a. Reagent
b. Procedure
c. Sensitivity and limitations

F. Chloracetophenone

1. Sodium sulfide test

a. Procedure
b. Sensitivity and limitations

G. Brombenzyl cyanide

1. Silver nitrate test

a. Procedure
b. Sensitivity and limitations

H. Diphenylaminochlorarsine - Adamsite

1. Sulfuric acid sodium nitrate test

a. Procedure
b. Sensitivity and limitations

GAS ATTACK ON CIVILIANS

I. The present status of the use of chemical agents as military weapons

A. Will gas be used in this war?

1. Why it has not been used

a. Fear of retaliation
b. Axis has not felt the need of it,
c. United Nations will not start using it.

2. Why it may be used

a. As a super weapon when the Axis reaches an impasse
b. Because of its use by officers (Japanese particularly) in incidents without sanction of higher authority
c. As a defensive weapon
d. All countries have very large stocks of agents.

II. The purpose of attacks using chemical agents on cities

A. To foster panic and lower morale

1. Popular fiction has created a tremendous overemphasis of efficiency of chemical agents.
2. The "contagious" spreading of vesicants would be very serious.

B. Relative efficiency of attacks on enemy objectives

1. Chemical agents are least effective on troops in the field.
2. Industrial plants, docks and shipyards are quite vulnerable to incendiary and explosive attacks.
3. Built-up urban centers are the most vulnerable to all three types of air attack.

III. Comparative efficiency of air attack with explosives, incendiaries and gas

A. With high explosives, the damage is small and limited; air must be precise to be effective (point bombing)
B. Incendiaries are used for area bombing.

1. Are easy to use and fairly efficient.
2. About 85% of incendiaries fall in harmless places.
3. About 7.5% start fires.

C. Vesicant agents are very efficient loads.

1. The effect lasts for days.
2. It effects everything in the area or everything coming to the area.

IV. The defense against chemical attack

A. Efficient gas defense organization

1. To prevent spread of contamination by regulation and decontamination
2. To identify gases and prevent casualties

B. Public education

1. Knowledge of the limitations of the chemical agents will prevent panic.
2. Knowledge of self-aid will prevent casualties.

V. The relation of weather to chemical attacks

A. The ideal conditions for chemical attack

1. Light wind
2. Warm to hot weather (for persistent agents)
3. Humidity is not very important.
4. Precipitation makes the attack less effective.
5. Barometric pressure is not important.

B. General considerations

1. Chemical warfare using persistent agents is most effective during the warmer months and the warmer parts of the day.
2. Local weather conditions are of much less importance in chemical attacks when the objectives are far from the fighting front.

FIRST AID AND SELF-AID

I. General statement - the purpose of this period

A. The material taken up deals with immediate non-medical treatment of injuries by gassed individuals or for their benefit by Citizens Defense Corps members at the time of contamination.
B. This does not include treatment for anything other than gas injuries. General first aid course gives that training.
C. The procedure to be followed after first aid treatment depends on the injury.

1. Serious sent to Cleansing Station
2. Ambulatory sent to residence

II. The extent of the treatment is limited because of several factors.

A. Time is the most important. It must be immediate or not at all.
B. It must be done by non-medical personnel.
C. It must be simple and generally applicable because of the training of the person giving treatment, the short time element and the lack of supplies.

III. Specific measures to be recommended

A. General comparison of chemical injuries to other injuries
B. The effects of lacrimators and treatment of these injuries
C. The effects of irritant smokes and treatment of these injuries
D. The effects of lung irritants and treatment of these injuries

1. Phosgene and diphosgene

a. Serious
b. Annoying but not serious

2. Chloropicrin

E. The effects of vesicants and treatment of these injuries

1. Mustard

a. Vapor effects on skin and respiratory tract
b. Liquid effects on skin and eyes

2. Lewisite

a. Vapor effects on skin, respiratory tract and eyes
b. Effects of liquid on skin and eyes
c. Arsenic poisoning is not of prime importance.

3. Nitrogen mustards

a. Differences from ordinary mustard
b. Special physiological effects

F. The effects of systemic poisons and treatment of these injuries

1. Regular first aid training should be used since these poisons are HCN, H_2S and CO.
2. Masks do not protect against CO, or HCN in high concentrations.

IV. Supplies which Citizens Defense Corps members should have available

a. Personal equipment to counteract burns
b. Post equipment needed

DECONTAMINATION

The process of decontamination refers to any means used by which a dangerous liquid or solid chemical agent on or in contact with terrain or objects is removed, destroyed or changed to harmless compounds. When applied to personnel or animals the process is called first aid.

The methods employed in accomplishing decontamination have given use to a number of synonymous terms for this process. However, the shades of meaning are contained in the names of the methods applied, rather than in the fundamental process and should be recognized as such.

It is necessary in considering the subject, that persistent rather than nonpersistent agents be kept in mind in regard to practical applications, because the latter type would not from this very nature, present any problem.

The presentation which follows does not presume to give all details of the subject, but emphasizes the salient points to be remembered in planning for decontamination operations.

I. Principles of decontamination

A. Chemical reactions resulting in either substitution, oxidation or hydrolytic products. The activity of the war gas is diminished, and generally the toxicity reduced to a negligible quantity. However, in some instances the products are toxic but the physical state of the new substance is such that the hazard is not as great as from the original agent.

1. Chlorination results in the substitution of chlorine atoms for hydrogen, which may give a series of products depending upon the number of hydrogen atoms replaced. However, one additional chlorine atom in the molecule of mustard, for example, reduces its toxicity below the danger point.
2. Chlorine also produces oxidation which results in products which are harmless.
3. Hydrolysis or breaking down by means of water into two non-toxic substances.

B. Physical means which are applicable

1. Aeration -- removal of agent in vapor state by air currents

a. Wind velocity accelerates rate of diffusion.
b. Temperature of ground and atmosphere influences volatility.

2. Burning of vegetation in contaminated area causing volatilization and combustion of agent
3. Mechanical coverings or absorbents (dirt, ashes, sawdust, etc., to control evaporation)
4. Flushing with hose -- mechanical removal accompanied by chemical phenomena
5. Solution in hydrocarbons and oils

    a. Dilutes agents but does not destroy them.
    b. Careful application required to prevent spreading.
    c. Use swabs on small areas and then discard. (Destroy swabs immediately after use.)

6. Soaps and detergents -- depend upon lowering of surface tension enabling water to "cut" the agent and remove it in an emulsified state.

II. Substances used in decontamination methods

In decontaminating, we are concerned with those practical methods which will accomplish the result quickly and cheaply.

The attention, therefore, must be focused on the means available for use involving extensive surfaces to be cleaned and large quantities of persistent agents to be removed. This differs materially from the small scale tests performed in laboratories, under which experimental conditions many other chemical reagents or methods could be used efficiently.

A. Chlorinating compounds, containing available free chlorine, provide best source of chlorine for practical work. Quantities required are many times greater than theoretical, and vary with character of surface to be decontaminated.

1. Chlorinated lime (35% and HTH or 70% refers to "available chlorine" or oxidizing power which is twice the chlorine content of hypochlorite in solution) used in dry mix or slurry rather than alone. Latter application not desirable because violent reaction and liberated heat produces dangerous concentration of vapor.

    a. Dry mix made in proportion by weight of 1 part of bleach to 3 parts of earth or substitute (2 parts to 3 parts on volume basis).
    b. Slurry is suspension of equal parts by weight of bleach and water. Requires special modifications of commerical types of spraying apparatus which is a handicap.
    c. Stability of bleaching powder in storage an asset although deterioration does occur slowly and when lowered below 8% available chlorine is not suitable for field work.
    d. Limited in application to metals and fabrics because of excessive corrosive action.

2. Hypochlorite solutions may be used to better advantage when compared to bleaching powder.

   a. Supply is more available and while not as stable in storage, yet it has the advantage of being renewable.
   b. Decontamination efficiency is equivalent.
   c. Cost per lb. is lower when calculated on the basis of available chlorine.
   d. May be used in ordinary spray apparatus.
   e. Speed of decontamination increased. Solution contains molecular form of hypochlorite which enables more surface contact with the persistent agent and increased velocity of reaction.

B. Water accomplishes process of hydrolysis which may be accelerated by increasing temperature, or addition of compounds which upon ionization produce an alkaline medium. (NaOH, Na_2, CO_3, Na_2S) moisture in air acts in similar manner.

III. Types of apparatus used depend upon spraying of decontaminating material by pressure.

A. The hand operated modification of an insecticide sprayer will be used in the decontamination exercise.

   1. Care must be exercised in preparing slurry to insure no stoppage of nozzle.
   2. The charge should not remain in apparatus more than 30 minutes to prevent excessive corrosion.
   3. Average unit coverage (medium contamination) in square yards by one gallon will vary from 4 to 12 and inversely as the porosity of the surface.
   4. May be used under conditions where application of solid decontaminating material would not give proper contact with agent.

D. Power driven truck mounted sprayer

   1. Affords a rapid means of decontaminating extensive surfaces such as roads free from tall grass or brush.

      a. No definite requirements can be given as to amount of decontaminating agent needed because no two decontaminating operations will be the same. (Basis of one pound of bleach per square yard of hard, smooth surface having medium contamination.) Porosity of surface increases quantity required.

2. Provides only convenient way of treating exterior of a contaminated building.
3. Disadvantage lies in tendency to develop mechanical difficulties because of heavy slurry used.
4. Time spent in charging and adjusting apparatus to time spent in spraying is in the ratio of 3 to 1.

C. Accessory tools required will be used in the field exercise and the uses pointed out at that time.

CLEANING STATIONS

I. Purpose - Cleansing of

A. The seriously wounded requiring hospitalization who have also been exposed to vesicant agents
B. The personnel of the gas cleansing station itself during and after their shift
C. Possibly decontamination squads when they finish their work and after all casualties have left the cleansing station.

II. Location

To be located only as part of a hospital, and for the protection of its equipment and personnel. If no facilities are available in the hospital some adjacent building should be used but the purpose remains the same.

III. Priorities

Stations in every instance to be adaptations of existing facilities--no new construction.

IV. Personnel

A. Number and training

1. The number will depend upon the casualty receiving capacity of the hospital. Alternates to be provided in case station is to be operated in two 12-hour shifts.
2. The personnel should consist of mobile medical teams, supplemented by auxiliaries to assist in undressing, carrying, cleansing and laundry routines. Physician to be stationed at undressing room entrance to determine procedures and precedence necessary - also to supervise administration. Another physician to be available for treatments given in dressing room. Both to supervise cleansing room. Nurses to carry major burden of cleansing and treatment - all personnel to be trained in specific tasks.

B. Dress

1. Those handling patients in contaminated clothing to be dressed in gas mask, protective gloves, impregnated shoes and surgical gown with protective apron which wraps completely around the body (full protective clothing discarded because impracticable).
2. Those cleansing the patient to have gas masks handy for use if vapor concentration mounts - otherwise aprons, surgical gowns and gloves and impregnated shoes.

V. Operational flow

A. Casualties delivered by ambulance. Driver and attendant in full protective clothing. Attendant assists in removing stretchers.
B. Outside stretcher-bearers carry stretchers into undressing rooms leaving them on saw-horses, going out for next load.
C. All garments cut off quickly by undressers; likewise contaminated splints and dressings.
D. Before bare back touches possibly contaminated stretcher, gasproof paper cover is unrolled length of stretcher.
E. Patient carried by inside stretcher team to cleansing room.
F. If in shock, bleeding or requiring other medical assistance, is taken immediately to dressing room before cleansing. After treatment cleansing proceeds. Dressing room thus becomes optional stage at discretion of physician in charge; patients not requiring emergency treatment being shunted right to cleansing room.
G. In cleansing room patients put through routine

1. sponging with hypochlorite
2. rinsing
3. lathering of entire body
4. rinsing
5. drying

H. After drying patient is placed in hospital gown on clean sheet.
I. Patient transferred to clean stretcher.
J. Patient is admitted to hospital.

VI. Emergency treatment

Administration of morphine and plasma. Such temporary splinting and dressing as may be required to save life. Needed surgical procedure which cannot be rushed to operating room because of danger of contamination.

VII. Equipment

A. In converting existing facilities the main structural problems will be setting up gas locks and providing hot and cold running water.

B. Main items of equipment which may require procurement ingenuity are: aprons, gloves and other clothing to be used in undressing rooms; gas-proof paper for stretcher covers; large fans for ventilating duct and steam-jenny.
C. Other items will be routine such as stretchers, saw-horses, bottles of solutions, bags or receptacles for contaminated clothing, etc.

VIII. Decontamination

Clothing cut off to be turned over to station laundry man who salvages valuables. Assumption is that clothing cannot be decontaminated and must be destroyed. Protective gloves, aprons, shoes, etc. to be decontaminated. Stretchers to be decontaminated with aid of steam-jenny.

IX. Circulation of stretchers

A. Patient remains on stretcher on which he was placed by ambulance team until after he is cleansed.
B. Contaminated stretcher is then removed and patient given clean stretcher.
C. Contaminated stretcher is decontaminated and returned to clean stretcher rack for use of patients as stated in B.
D. These stretchers are sent out front and reloaded into ambulances when patients on them are admitted to hospitals.

X. Handling of the dead

Any casualties when they die between placement in ambulance and admission to cleansing stations are to be transferred by ambulance to mortuary service.

XI. Irrigation, etc.

Eye irrigation assumed to have been done before casualty arrives. Facilities needed only for any contamination required in station. Facilities for irrigating nose, mouth and throat; likewise emesis basins, bed pans and urinals to be available in all rooms.

XII. Sitting case casualties

Sitting case casualties to be handled like stretcher cases but permitted to do as much as possible for themselves with help of attendant only as needed. Small undressing and shower cabinets can be provided for them.

XIII. Identification

Vulcanized fibre tag to be attached to patient and cleaned with him. Before admission to hospital number is transferred to hospital record and all needed information secured. Other tags, possibly in distinctive colors, reading quantity grain morphine or 500 cc plasma to be attached to patient as treatment is administered to serve as continuous and unmistakable record.

ISSUE, CHARACTERISTICS AND FITTING OF MASKS

I. Principles of operation of the gas mask

A. Removal of gases and vapors by adsorption

1. Activated charcoal alone is used
2. The gradual loss of effectiveness
3. The specificity of masks

B. Mechanical filtration of air containing dusts

II. Parts of the mask

A. Facepiece assembly

1. Facepiece
2. Eyepieces
3. Head-harness
4. Outlet valve

B. Canister and inlet valve

C. Carrier

III. Demonstration of how to adjust the mask

A. Tightening the head-harness
B. Tests for fit
C. Removal of the mask
D. Replacement in carrier

IV. Individual fitting of masks by the class

CARE, STORAGE AND STERILIZATION OF MASKS

I. The rules for the individual

A. Each individual is responsible for the care of his own mask.

1. A mask poorly cared for may be useless in time of need.
2. Waste must be avoided by making the mask last.

B. Special care in training

1. Keep head-harness loose.
2. Do not stretch head-harness unduly in putting on the mask.
3. Do not throw the mask around or use it for any purpose other than gas training.
4. Dry out mask after use.
5. Prevent water from entering canister.
6. Do not pile equipment on top of the mask.
7. Keep organic solvents away from the lenses.
8. Keep the mask cool and in a dry atmosphere.

C. Rules for individual care

1. Carry nothing but the mask in the carrier.
2. Do not neglect the mask or treat it roughly.
3. Keep the facepiece stuffed with paper.
4. Keep the mask where it cannot be damaged by accidental blows or pressure.
5. Keep canister sealed tightly to facepiece.

II. Storage of masks in organizations

A. Store in a cool, dry place.
B. Avoid storage near hot objects such as stoves and radiators.
C. Do not store wet or damp masks or carriers.

III. Sterilization of masks

A. Disinfectants for gas masks

1. Formaldehyde (1 part of commercial formalin, 40%, to 12 parts of water)
2. Roccal, Zephiran, Cepacol, Phemerol or similar alkylammonium compounds

B. Directions for disinfection

1. Keep the facepiece below the canister.
2. Wet a small rag with disinfectant and sponge the entire facepiece.
3. Allow the mask to dry, canister upwards.

BASIC CIVILIAN DEFENSE ORGANIZATION

I. Each gas officer should understand local civilian defense organization and its relationship to the State and Federal programs.

A. Speaker will discuss organization and program recommended by the U. S. Office of Civilian Defense.
B. Students will find variations in their communities, usually minor and made to adapt OCD recommendations to local needs and peculiarities.
C. Stress importance of uniformity.

II. Local Defense Council (Define) - (Page references are to "Organization Outline for Local Defense Councils.") (p. 1)

A. Relationship to State Defense Council (p.2)
B. Relationship of State and Local Defense Councils to the U. S. Office of Civilian Defense (p. 2)
C. Relationship of State and Local Defense Councils to other National War Agencies (p. 3)
D. Financing.

1. Local and State (p. 3)
2. Federal loan of equipment (p. 3)

E. Organization (Refer class to chart, page 7)

1. Main functioning branches

a. Civilian Protection Branch (Define) (p. 3)
b. Civilian War Services Branch (Define) (pp. 3 and 4)

2. Service sections

a. Civilian Defense Volunteer Office (Define) (p. 4)
b. Information Committee (Define) (p. 4)

F. Administrative Staff

a. Prescribed basic insigne (Uncover insignia chart and describe staff insigne and general significance of insignia) (p. 5)

G. Civilian Defense Auxiliary Group (p. 5)
H. Forest Fire Fighters Service (p. 6)
I. Civil Air Patrol (p. 6)
J. The Evacuation Service (separate sheet)
K. United States Citizens Service Corps (Refer class to chart, page 9. Volunteers are required in civilian war services) (p. 20)

L. Civilian Protection (Point to importance of continued organization in spite of successes in battle)

1. United States Citizens Defense Corps (Define. Refer class to chart, page 8, and have them make changes; add to staff;

   a. Senior Gas Officer (Assistant Gas Officers, Gas Reconnaissance Agents, and Laundry Officer and staff members)
   b. Bomb Reconnaissance Officer
   c. Waterworks Officer
   d. Health Officer

2. Add Emergency Welfare Service and move Emergency Feeding and Housing to it. State that rescue may become separate service or part of Emergency Medical Service. "Staff Manual," and other early OCD publications list "crews," "squads," "units" -- "Regulations No. 3," pp. 7 and 8, change nomenclature. Mention origins of C. D. and need for speed - British experience - change in raid tactics - necessity for occasional changes in organization pattern. Gas program is new; there has been no modern gas attack on cities; will stand improvement; class member will be able to suggest improvements; imperative that general pattern remain same on a national basis because of need for Chemical Warfare Service liaison and mutual aid; may be necessary for class members to restrain themselves from highly individualistic innovations.

   a. Call attention to individual jobs of Staff Officers, Service Chiefs, and their units and insignia. (Data from Regulations No. 3)

      1. Commander
         a. Chaplains
         b. Instructors
         c. Messenger Unit
         d. Driver Unit

      2. Staff Executive Officer Unit
         a. Controller
         b. Personnel Officer
         c. Property Officer
         d. Transportation Officer
         e. Bomb Reconnaissance Agents
         f. Senior Gas Officer
         g. Chief Technical Intelligence Officer
         h. Waterworks Officer
         i. Health Officer
         j. Service Chiefs

i. Chiefs of Wardens Service
   A. Air Raid Wardens (Sector, Precinct, Zone)
   B. Fire Watchers
   C. Fire Guard (new - to be announced at later date)

ii. Chief of Emergency Police Service
   A. Auxiliary Police

iii. Chief of Emergency Fire Service
   A. Auxiliary Firemen
   B. Rescue Unit (change to be announced at later date)

iv. Chief of Emergency Medical Service
   A. Medical Unit
   B. Nurses Aide Unit

v. Chief of Utility Service
   A. Utility Repair Unit

vi. Chief of Emergency Public Works
   A. Decontamination Unit
   B. Demolition and Clearance Unit
   C. Road Repair Unit

vii. Chief of Welfare Service

b. Training prescribed for Citizens Defense Corps being revised at moment.
c. Plant protection with reference to Army, Navy responsibility in allocated plants (Memorandum 14, Medical Division)
d. Service functions are coordinated at control center by the Commander.
e. Senior Gas Officer and his relationship

1. He and his assistants, including Gas Reconnaissance Agents and his Laundry Officer work with the Chiefs and members of other services.
2. Relationship to State Gas Consultant (Briefly define latter's functions)
3. Relationship of Senior Gas Officers and State Gas Consultants to the Regional Gas Officer or Sanitary Engineers, and the Gas Protection Section Staff in the U. S. Office of Civilian Defense (Stress logical development of medical and non-medical phases of program in the Medical Division of the U.S.O.C.D. (Personal protection, medical and non-medical gas officers) Chain of Command).

III. Question period

GENERAL GAS PROTECTION

I. Classification of gas protection

A. Individual protection will be the main defense of the members of the Citizens Defense Corps.

1. Gas masks will be issued to all members of the Citizens Defense Corps who are required by their duties to be exposed to gases if they are used.
2. In addition protective clothing will be provided for:

a. Gas reconnaissance agents
b. Air raid wardens (limited)
c. Auxiliary and regular police and fire
d. Rescue squads
e. Mobile medical teams
f. Cleansing station personnel
g. Repair squads of public works and utilities
h. Decontamination squads
i. Certain staff members (incident officers, etc.)

3. If a satisfactory protective ointment is available, it will be supplied to all Citizens Defense Corps members who may require it.

B. Civilian protection measures

1. Gas shelters will not be generally available; tightly closed rooms must be provided in individual homes.
2. Gas alarms are used to warn the citizens of a community to take shelter in their homes; wooden clackers will be used exclusively.
3. Cleansing stations are designed to protect the hospital staff and facilities from contamination by injured, gassed casualties.
4. Personal cleansing (self-aid) is required of uninjured contaminated persons, including Citizens Defense Corps members.
5. Protection of supplies is required to prevent contamination of food, so that it can be used without danger after the gas attack.

II. Protective clothing

A. Impermeable type is the only type available at present.

1. The cloth is treated with plastic material which sheds vesicants mechanically.
2. It protects against both liquid and vapor.
3. It is difficult to decontaminate and reuse.
4. It becomes brittle in cold weather and cracks.
5. It can only be worn for short periods (15 to 30 minutes) in hot weather because it decreases heat dissipation from the skin.
6. Shoes must be impregnated or special boots must be worn.

B. Permeable clothing must be impregnated to neutralize vesicants.

1. Not available to civilian defense at present.
2. It acts by neutralizing the vesicant and after heavy exposure loses its effectiveness.
3. It may not be effective against new vesicants.
4. More comfortable than impermeable type.

C. Improvised clothing

1. Raincoats of various types, particularly plastic capes
2. Heavy clothing, galoshes, and boots
3. Goggles for eye protection
4. Umbrellas
5. Shower curtains

III. Protective ointments (if available)

A. Advantages

1. Can be used more generally because of their low cost.
2. Can be carried by individuals at all times.

B. Disadvantages

1. No completely effective ointment has been discovered.
2. Must be renewed frequently during use.
3. Give misleading sense of security.

IV. Gasproof rooms

A. Unventilated rooms

1. Centrally located and easily available.
2. Must be of strong masonry or concrete construction, if possible.
3. Each person should have 150 cu. ft. of air space.
4. No open fires or smoking (to conserve oxygen).
5. A gas lock is required for entrance and exit during gas attacks.
6. Should have more than one exit.
7. Protection for long period is not possible.

B. Ventilated rooms

1. Expensive construction is required, hence not available to most people.
2. Less space is needed per person.
3. A positive pressure is maintained inside so less attention is given to tightness.
4. Ventilated with uncontaminated air.
5. Dependent upon blower which must have an independent power source. Collective protectors have been requested for certain vital defense installations.
6. Canister must be renewed periodically.

V. Prevention of spread of contamination

A. Cleansing Stations

1. To prevent spread of contamination into hospitals and Casualty Stations.
2. To aid in the cleansing of Citizens Defense Corps personnel required to work in contaminated areas.

B. Self-aid (See Operations Letter No. 46)

1. Expected of all individuals not otherwise injured.
2. Prompt self-treatment is far better than delayed treatment at Cleansing Stations.
3. Prevents overcrowding of facilities needed by those seriously injured.

C. Restriction of persons not active in defense to their homes

1. A tightly closed room is the best protection.
2. A warden or gas officer can guide necessary evacuations safely.
3. The gassed area can be limited and avoided.

GAS RECONNAISSANCE EXERCISE -- INSTRUCTORS NOTES

Class should be divided into 4 to 6 groups, with an instructor for each group. The group will rotate in their study of the incidents, so that each group will prepare a solution for each incident. Each group should select a leader who will give the report of the group.

Situation 1. An area large enough to accommodate simulated craters from three 30 lb. HS bombs should be used. The simulation of the craters should indicate that two of the bombs have exploded, as shown by splashes (motor oil), but there should be none around the unexploded bomb. This will introduce for consideration the question of reporting an unexploded bomb of any type through proper channels, and will require the dispatch of a bomb reconnaissance agent.

Situation 2. This area can be prepared by spilling lubricating oil to simulate a dark vesicant agent, but all attempts to identify the vesicant by means of detector material will fail.

Situation 3. This area should have the limits designated by stakes with a dummy made by stuffing over-alls with straw, inside the area. All determinations for any persistent agent should fail. The logical conclusion should be that a non-persistent gas has been used.

Situation 4. The area for the incident should be placed in front of a small building which can be designated as a hospital. The crater should be evident and detector paper and crayon should show evidence of persistent agents. The area marked by stakes should be small enough to indicate that only one decontamination unit is needed.

Situation 5. Another area should show signs of raking, as would be performed by the decontamination unit, and permanently placed indicators should give evidence that decontamination was necessary. One section of the area should be arranged so that positive evidence may be obtained by the students using detector materials, indicating that decontamination is not complete.

Situation 6. Should include an area about the size of a football field. Permanently placed detector paint and crayon should give evidence that a spray of vesicant has been used. This can be further indicated by spraying motor oil. If possible, small sample bottles containing dirt actually contaminated with HS (or dimethylsulfate) should be placed at certain points so that actual tests can be carried out with HS vapor detector kit. Likewise, bottles containing no contamination should be placed in the area and tested.

In all the above situations, strips of lath or stakes can be used to outline the areas involved. Small pieces of detector paper may be attached by thumb tacks and crayon marks may be made on the lath. Where it is desired to show positive evidence, these detectors should be treated so as to give a positive reaction for vesicants.

CONTROL CENTER

I. Air Raid Warning System

A. Spotters
B. Filter Center
C. Information Center
D. District Warning Center
E. Control Center

II. Problem of control

A. Peace-time municipal organization not entirely adequate for rapid large scale emergency action under air raid conditions.
B. Air raid conditions require supreme coordination of all services and facilities.
C. Control system must:

1. Transmit picture of situation in field rapidly and accurately to Commander
2. Provide in the control center all the facilities needed for making fast, sound decisions
3. Transmit instructions and information rapidly to all those who must act to meet the situation

III. Organization and personnel

A. Personnel

1. Commander
2. Service chiefs
3. Staff officers - gas specialist
4. Plotter, panel clerk, etc.
5. Communications personnel

B. Area covered by control center
C. Mutual aid

IV. Facilities and equipment

A. Room lay-out
B. Maps, control panel, etc.
C. Gas protection, blackout, etc.

V. Communications

A. General
B. Wire: telephone, municipal telegraph
C. Radio
D. Messengers

VI. Operating procedure in general

A. Receipt and distribution of warning messages
B. Initial raid damage reports
C. Evaluation and execution
D. Supplementary reports

VII. Operating procedure in relation to gas defense

A. Gas detected by warden
B. Report to control center
C. Dispatch of gas reconnaissance agent
D. Reconnaissance reports
E. Evaluation by gas officer
F. Transmission of instructions and information

VIII. Questions

CONTAMINATION OF WATER AND FOOD

AND

TREATMENT OF CONTAMINATED SUPPLIES

Contamination of Water by Chemical Warfare Agents

I. Classification of agents based on their effect in water

A. Agents not necessarily toxic although probably rendering water non-potable

1. Thermite
2. Crude oil
3. HC mixture
4. FS mixture
5. Titanium tetrachloride
6. Carbon monoxide

B. Agents producing turbid water, which is safe after removal of the turbidity

1. Adamsite
2. Diphenylchlorarsine
3. Diphenylcyararsine

C. Phosgene - water is not rendered toxic even by fairly high concentrations.

D. Agents which require expert treatment and analysis before water is safe

1. Chlorpicrin
2. Mustard
3. Nitrogen mustards
4. Lewisite
5. Ethyldichlorarsine

E. Agents not classified (water should be regarded as unsafe).

1. Brombenzylcyanide
2. Chloracetophenone

F. Compounds possibly used for deliberate contamination

1. Arsenates
2. Arsenites
3. Cyanides
4. Heavy metal salts
5. Alkaloids and toxins
6. Pathogenic bacteria

II. Examination of water suspected of being contaminated by chemical warfare agents

A. Agents of Group A above. Effect on potability

B. Agents of Group B above

1. Determination of chlorine demand
2. Determination of arsenic content

C. Phosgene

1. Presence indicated by tests for acid and chloride ion

D. Agents in Group D above

1. Chlorpicrin

a. Boil with alcoholic potassium iodide and make ordinary nitrite test.

2. Mustard

a. Determination of acidity
b. Determination of chlorine demand
c. Sodium iodoplatinate

3. Nitrogen mustards

a. Determination of acidity

4. Lewisite

a. Determination of arsenic content

5. Ethyldichlorarsine

a. Determination of arsenic content

E. Agents in Group E above

Both detected by determination of acidity.

F. Agents in Group F above

Special methods

III. Treatment

A. Group A. No treatment necessary

B. Group B. Removed by standard water purification processes

C. Group C. No treatment necessary

D. Group D

1. Chlorpicrin. No satisfactory treatment

2. Mustard. Treatment with large doses of active carbon followed by usual settling procedures and chlorination. Must be checked by chlorine demand.

3. Nitrogen mustards. Fairly readily hydrolyzed at pH6, particularly if water is warm.

4-5. Lewisite and diethylchlorarsine. No treatment possible.

E. Group E. No treatment has been worked out.

F. Group F. Special treatment for different cases.